

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claims 1-19 (cancelled)

20. (new): An intraluminal material removal device comprising: a rotatable cutter assembly in communication with a drive shaft for receiving rotational torque from the drive shaft, the cutter assembly comprising an adjustable diameter cutter having a plurality of cutting blades, wherein the adjustable diameter cutter has a first diameter when rotated in a first direction and a second diameter, when rotated in a second direction opposite the first direction.

21. (new): The device of claim 20, wherein the adjustable diameter cutter has a plurality of material removal ports in communication with a lumen, wherein the material removal ports separate the cutting blades.

22. (new): The device of claim 21, wherein each of the material removal ports is provided in a depression formed between adjacent cutting blades.

23. (new): The device of claim 20, wherein the cutter assembly further comprises a fixed diameter cutter distally positioned from the adjustable diameter cutter, the fixed diameter cutter having a plurality of cutting blades and a plurality of material removal ports in communication with a lumen.

24. (new): The device of claim 23, wherein the adjustable diameter cutter or the fixed diameter cutter has a design to operate using the principle of differential cutting.

25. (new): The device of claim 20, wherein the plurality of cutting blades of the adjustable diameter cutter are pivotable on axes parallel to a central longitudinal axis of the cutter assembly to expand to the first diameter and to contract to the second diameter.

26. (new): The device of claim 25, further including a plurality of stop faces to define the first diameter of the cutting head when the cutting blades are pivoted.

27. (new): The device of claim 25, further including a plurality of support faces to contact the cutting blades when the adjustable diameter cutter is in the second diameter.

28. (new): An intraluminal material removal device comprising: a rotatable cutter assembly in operably coupled to a distal end of a drive shaft, the cutter assembly comprising an expandable diameter cutter having a plurality of cutting blades pivotable on axes parallel to a central longitudinal axis of the cutter assembly.

29. (new): The device of claim 28, wherein the expandable diameter cutter has a design to operate using the principle of differential cutting.

30. (new): The device of claim 28, wherein the expandable diameter cutter has a plurality of material removal ports in communication with a lumen, wherein the material removal ports separate the cutting blades.

31. (new): The device of claim 28, further including a plurality of stop faces to define the diameter of the cutting assembly when the cutting blades are pivoted to an expanded position.

32. (new): The device of claim 31, further including a plurality of support faces to contact the cutting blades when the cutting assembly is in a retracted position.

33. (new): An intraluminal material removal system comprising: a cutter assembly and a drive shaft that is rotatable and translatable for rotating the cutter assembly, the drive shaft having sections of different helical orientations adjoining one another along a longitudinal axis, wherein at least one section is a predominantly left-lay helical orientation and at least one section is a predominantly right-lay helical orientation.

34. (new): The system of claim 33, further including a hollow sheath having a diameter larger than the drive shaft diameter and forming a lumen between an inner surface of the sheath and an outer surface of the drive shaft.

35. (new): The system of claim 34, wherein the cutter assembly further comprises a plurality of material removal ports in communication with the lumen.

36. (new): The system of claim 33, additionally comprising a control unit capable of receiving operator input and the control unit is capable of calculating and directing automated operating conditions based on the operator input.

37. (new): A method for cutting material from the internal of a lumen using a material removal system having a cutter assembly with a plurality of blades, comprising:

expanding the cutter assembly to a first diameter by rotating the cutter assembly in a first direction, and

retracting the cutter assembly to a second diameter by rotating the cutter assembly in a second direction, opposite of the first direction.

38. (new): The method of claim 37, wherein the expanding is by pivoting of the blades of the cutting assembly on axes parallel to a central longitudinal axis of the cutter assembly to a diameter defined by stop faces.

39. (new): The method of claim 37, further including aspiration to move cut material into ports of the cutter assembly during the expanding of the cutter assembly.